Stewards Academy

ICT KS3 Year 7 Spring 1 Blended Learning Booklet

Name:

Form:

Aim to complete one lesson each week. Write out the title and LI and then complete the tasks.

The Knowledge Organiser on page 4 and 5 have some key information and vocabulary to help you with this unit.

Upload all work onto ClassCharts for feedback.

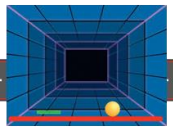
Contents

Big Picture – Year 7 Overview
ICT Department

Next Year

Students will create a maze game which will form their assessment

Create Maze Game



Students will learn how to create the classic game "PONG"

Create Pong Game

Students will learn different algorithms to create shapes

Creating Shapes In Scratch

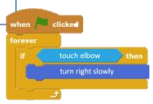
Students will learn what collision detection is and how to implement this in a game

Collision Detection

Students will learn what algorithms are and use sequence to complete tasks and games

Algorithms, Sequence

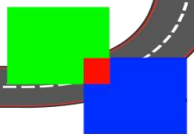
Students will use iteration to improve code efficiency when completing tasks



Iteration

Students will use selection to improve code efficiency when completing tasks

Selection



UNIT 3 - Programming

Students will be assessed by an end of unit exam

End of unit Exam

Students will create revision quiz to help them with the end of unit assessment

Scratch revision quiz

Students will learn the rules of binary addition and be able to apply these

Binary Addition

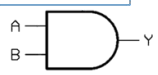
Students will learn how input and output devices are used in a computer system

Input and Output Devices

Students will learn the components in a computer

Hard drive
CPU
RAM
Motherboard
Power Supply

Students will learn about logic gates and how to complete truth tables



AND
OR
NOT Logic Gates

Students will learn what binary is and how it is used in computers

Binary and denary

UNIT 2 – Computing Theory

Students learn different skills in Microsoft Publisher by creating a poster on where to report inappropriate behavior when using the internet

Exam about E-safety and Microsoft Products

Students sit an exam to assess previous learning.

Adding images
Adding text
Adding table

Students learn where to report inappropriate behavior and research what makes a strong password

Where to report Inappropriate behavior

Learn to follow the ICT assessment procedure using Microsoft Excel

Barry's Burger Van Assessment

Learn how to use features in Microsoft Excel through different games

Cell, rows Cell reference, worksheet,

Learn how to use functions and formulas in Microsoft Excel

=sum()
=min()
=max()
=mode()

Learn how to use boarders and formatting techniques by creating your own timetable

Boarders, Conditional Formatting

PowerPoint presentation on Cyber Bullying

Learn the assessment procedure using Microsoft PowerPoint

Learn how to use Microsoft PowerPoint and apply new skills to a presentation

Images
Text
Animation
Transitions

Learn the use of ICT equipment at Stewards Academy

Logins and User Names

Microsoft

UNIT 1 – Using Microsoft Products

Year 7

KS3 Knowledge Organiser - Computing

Stewards Academy

Binary

As computers only understand 1s and 0s, all data must be converted into binary to be processed. Binary can be used to represent all numbers in our standard number system. (base 2)

128	64	32	16	8	4	2	1
1	0	0	1	1	0	1	1

128 + 0 + 0 + 16 + 8 + 0 + 2 + 1 = 155

Binary Numbers are easier to Convert using Tables

Drawing a table with binary place values in the first row makes binary to denary conversion easier.

EXAMPLE: Convert the 8-bit binary number 00110101 to a denary number.

1) Draw up a table with binary place values in the top row. Start with 1 at the right, then move left, doubling each time.
2) Write the binary number 00110101 into your table.
3) Add up all the numbers with a 1 in their column: 32 + 16 + 4 + 1 = 53

So 00110101 is 53 in denary.

128	64	32	16	8	4	2	1
0	0	1	1	0	1	0	1

Each column is just a power of 2. i.e. $2^7, 2^6, 2^5, 2^4, 2^3, 2^2, 2^1, 2^0$.

This works with all binary numbers — just draw as many columns as you need, doubling each time.

8-bit numbers can represent the denary numbers 0-255. 16-bit numbers can show the numbers 0-65535, and 32-bit can show the numbers 0-4294967295.

Convert Denary to Binary by Subtracting

When converting from denary to binary, it's easier to draw a table of binary place values, then subtract them from largest to smallest. Have a look at this example:

EXAMPLE: Convert the denary number 79 into an 8-bit binary number.

1) Draw an 8-bit table.
2) Move along the table, only subtracting the number in each column from your running total if it gives a positive answer.
3) Put a 1 in every column that gives a positive answer, and a 0 in the rest.

So 79 converted to an 8-bit binary number is 01001111.

128	64	32	16	8	4	2	1
0	1	0	0	1	1	1	1

79 − 128 = −49 (not positive)
79 − 64 = 15
15 − 32 = −17 (not positive)
15 − 16 = −1 (not positive)
15 − 8 = 7
7 − 4 = 3
3 − 2 = 1
1 − 1 = 0

There are other methods to convert denary to binary, so just choose the one you are most comfortable with.

Denary/ Decimal

Decimal is the number systems humans use. In our standard number system we have ten different digits. (0,1,2,3,4,5,6,7,8,9) (Base 10)

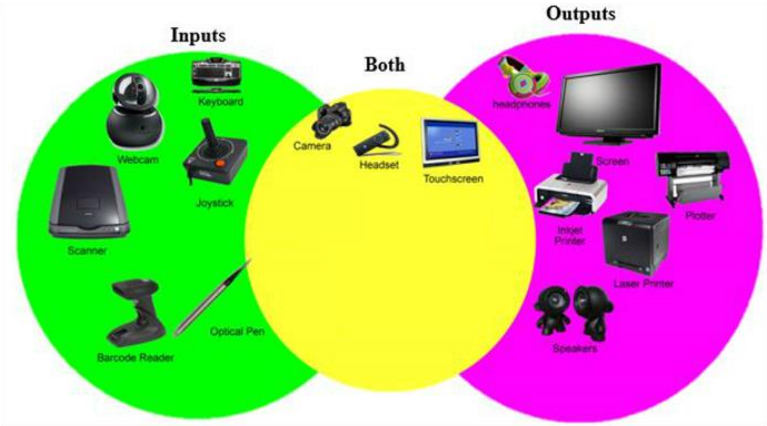
BINARY
IT'S AS
EASY AS
01 10 11

Hexadecimal Numbers

Hexadecimal is another number system used regularly in programming. Hex uses a combination of digits and letters in order to represent a number.

Denary	Hex	Binary	Denary	Hex	Binary
0	0	0000	8	8	1000
1	1	0001	9	9	1001
2	2	0010	10	A	1010
3	3	0011	11	B	1011
4	4	0100	12	C	1100
5	5	0101	13	D	1101
6	6	0110	14	E	1110
7	7	0111	15	F	1111

Input and Output Devices

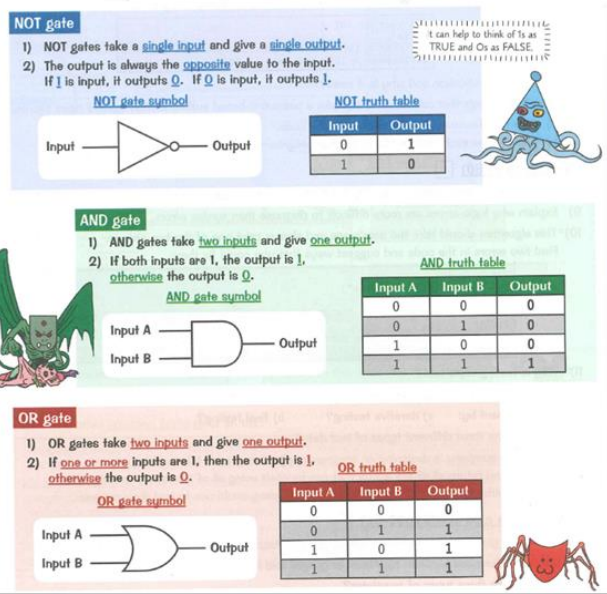


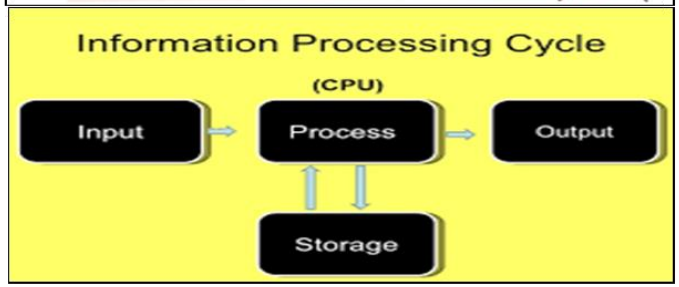
KS3 Knowledge Organiser - Computing

Logic Gates

Logic gates take binary information and give an output based on the Boolean operations (NOT, AND, OR)

- Logic gate a special circuits built onto computer chips
- Each Logic gates has a corresponding truth table





Cloud Computing

Hosting is where a business uses its servers to store files for another person or organisation.

A recent use of internet is for general storage of user files and also providing online software. This is cloud computing, or simply 'The Cloud'.

Cloud storage has some pros and cons.

Pros of the cloud

- Users can access files from any connected device.
- Easy to increase how much storage is available
- No need to buy expensive hardware to store data.
- No need to pay IT staff to manage the hardware.
- Cloud host provides security and back ups for you.
- Cloud software will be updated automatically.

Cons of the cloud

- Need connection to the Internet to access files.
- Dependent on host for security and back-ups.
- Data in the cloud can be vulnerable to hackers.
- Unclear who has ownership over cloud data.
- Subscription fees for using cloud storage and software may be expensive.

Components in a PC

Power Supply Unit(PSU): There is a PSU Inside every computer that provides its power.

Hard Drive: A hard disk is a magnetic storage device for digital data.

RAM: RAM is the memory to store computer programs whilst they are running.

CPU: A CPU (Central Processing Unit) is the core of every Personal Computer. Without it, no PC can function.

Motherboard: The Motherboard is the main printed circuit board in the computer.

ROM: Rome tells the CPU how to boot up.

Lesson 1

LI: Understand how input and output devices are used in a computer system

LI: Understand how input and output devices can be used to support people with disabilities

Input and output

Input puts data into a device. Output sends data out of a device.

Input

Output

A touch screen can be input and output, because the 'touch' control is input whereas the 'screen' display is output.

Any technology which connects to a device to expand its functionality is called a **peripheral**.

Worked example

Trevor is creating a podcast. Choose **two** appropriate input and output devices he should use from those shown opposite. **(2 marks)**

Input = microphone
Output = speakers

Now try this

Which **one** of these is an input device? **(1 mark)**

A ☐ Projector B ☐ Speakers
C ☐ Microphone D ☐ Headphones

Input and output

1 Complete this diagram, which represents a technology device. Choose the correct **two** words from the word box. **(2 marks)**

decision	output	storage	peripheral	input

2 Which of these is an output device? **(1 mark)**

A ☐ Microphone **B** ☐ Scanner **C** ☐ Digital camera **D** ☐ Projector

3 A touch screen, such as on a smartphone, can be used for both input and output. Explain why this is. **(4 marks)**

.....

.....

.....

.....

4 Match the input and output devices to the technology systems. **(4 marks)**

Actuator	Video conferencing
Microphone	Games console
Sensor	Radio-controlled car
Force feedback	Car wash

Extension

Please research some input/ output devices which may help people with certain disabilities.

Write down some the devices you find. Can you explain how these work?

Lesson 2 and 3

LI: To learn the components inside a computer and how they work

Main components of a computer

Components are the parts inside a device.

You should be familiar with the components inside a PC – components inside other devices are similar.

Component	Name	Description
	Motherboard	• Allows communication between components • Is a PCB (Printed Circuit Board) where all the other system components plug in
	HDD (Hard Disk Drive) (storage device)	• Permanent memory for data storage See page 50 for more on memory
	RAM (Random Access Memory)	• Temporary memory • Makes processing more efficient See page 50 for more on memory
	PSU (Power Supply Unit)	• Takes power from mains and feeds into motherboard • Fan keeps it cool
	CPU (Central Processor Unit) + fan + heat sink	• Processes data • Fan and heat sink keep it cool See page 48 for inside the CPU
	Graphics card (expansion card)	• Boosts graphics capabilities of those built into motherboard
	Sound card (expansion card)	• Boosts sound capabilities of those built into motherboard.
	Optical drive	• Reads CDs and/or DVDs

Worked example

(a) Which **one** of these components uses a fan to keep them cool? **(1 mark)**

A ☐ Hard drive B ☐ RAM

C ☑ PSU D ☐ Motherboard

(b) A CPU uses a fan for cooling.

What cooling method is used on most CPUs in addition to a fan? **(1 mark)**

Heat sink

Now try this

Which **one** of these components is a type of memory? **(1 mark)**

A ☐ CPU B ☐ RAM C ☐ PSU D ☐ Motherboard

Think about what the initials stand for to help you answer this question!

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Answer the questions below

1 Which of these **two** components need to be cooled when running? **(2 marks)**

- **A** ☐ RAM
- **B** ☐ HDD
- **C** ☐ CPU
- **D** ☐ PSU
- **E** ☐ ROM

2 **(a)** State the main role of the CPU. **(1 mark)**

.....

(b) State the main role of a Hard Disk Drive. **(1 mark)**

.....

3 Explain, using examples, what expansion cards are and what role they play in a PC. **(4 marks)**

Expansion cards can be for sound or .....

.....

.....

.....

.....

<u>Extension – Please complete in your home learning exercise books</u>

Draw the components needed for a computer to work in your exercise book. Write the name of the component next to your drawing. You could also research the costs of each of components using the internet.

Can you also research what ROM is? What is ROM responsible for in a computer?

Lesson 4 and 5

LI: to understand how AND, OR and NOT logic gates are used.

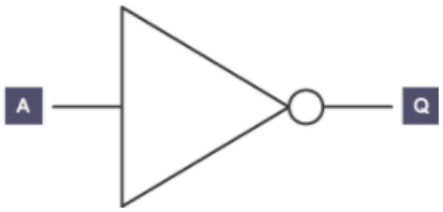
LI: understand how to complete a trace table based on logic gates.

Computers use logic gates to carry out operations. Each logic gate represents a Boolean operator NOT, AND and OR.

A gate takes binary data (1 or a 0), apply a Boolean expression (NOT, AND, and OR), then output a binary result (1 or a 0).

NOT gate

A NOT gate has just one input. The output of the circuit will be the opposite of the input. If 0 is input, then the output is 1. If 1 is input, then 0 is output.



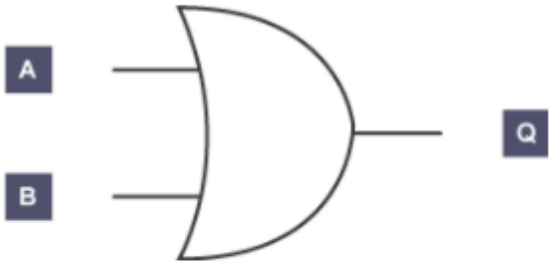
If A is the input and Q is the output, the truth table looks like this:

A	Q
1	0
0	1

The Boolean expression is written as **Q = NOT A**.

OR gate

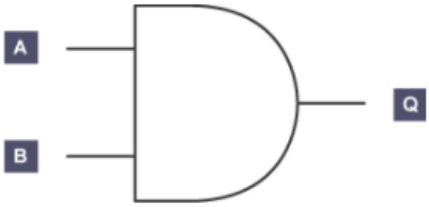
The OR gate has two inputs. One or both inputs must be 1 to output 1, otherwise it outputs 0.



The truth table would look like this:

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

The Boolean expression is written as **Q = A OR B.**



The truth table would look like this:

A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

The Boolean expression is written as **Q = A AND B.**

Please watch this YouTube video below on logic gates

https://www.youtube.com/watch?v=mdd90gXRWeY

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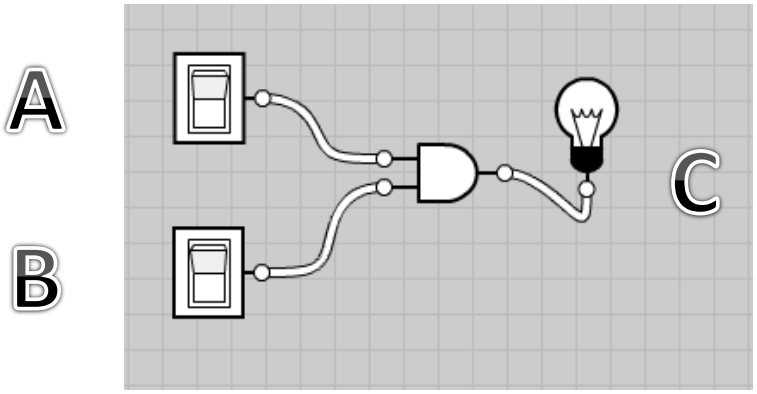
Using logic gates – Year 7

Please use the website http://www.neuroproductions.be/logic-lab/ to complete this task.

1. Set up a circuit by using 2 Switches, 1 light bulb connect through "And Gate"

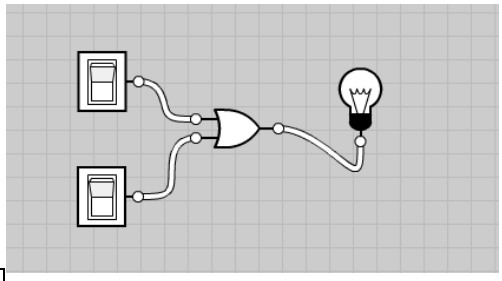


2. Investigate:- (Fill in whether the light bulb (c) is on or off)

Switch A		Switch B		Light Bulb C	
On	1	Off	0		
Off	0	On	1		
Off	0	Off	0		
On	1	On	1		

3. Can you put the correct 1 or 0 in the final column?

4. Now try the same by using an **"Or Gate"**

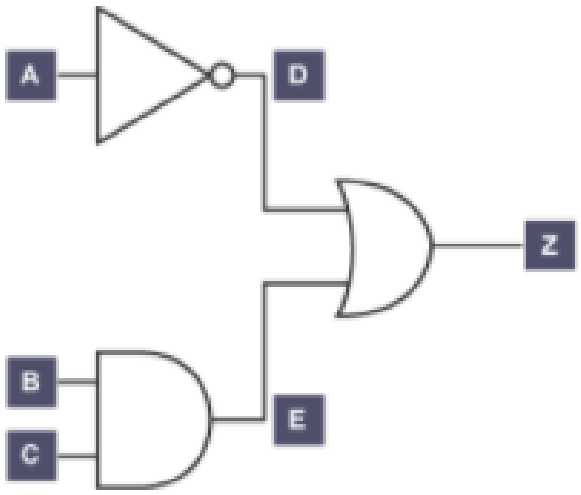


Switch A		Switch B		Light Bulb C	
On	1	Off	0		
Off	0	On	1		
Off	0	Off	0		
On	1	On	1		

5. Try making your own table and circuit using a **"Not Gate"** (note 1 connection)

Complex logic gates

Logic gates can be built up into chains of **logical decisions**. Some logic gates may have more than two inputs. The diagram below shows a **complex logic gate** combining three simple gates.



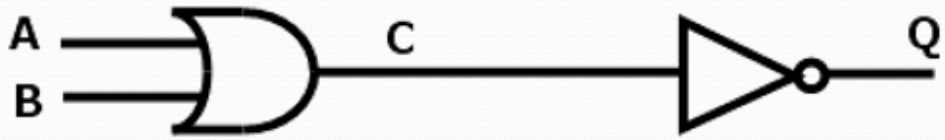
Altogether there are three inputs and eight possible outcomes. To solve the **truth table** below, first find D, then E and finally Z. Complete a whole columnn before moving on to the next column. D depends only on A, E depends on B and C, and Z depends on E or D.

This logic gate truth table is written as:

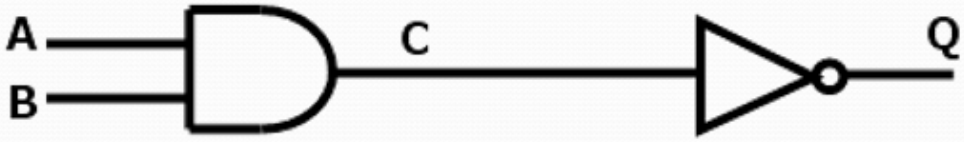
A	B	C	D = NOT A	E = B AND C	Z = D OR E
0	0	0	1	0	1
0	0	1	1	0	1
0	1	0	1	0	1
0	1	1	1	1	1
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	0	1	1

This circuit would be written as **Z = D OR E** or **Z = NOT A OR (B AND C)**.

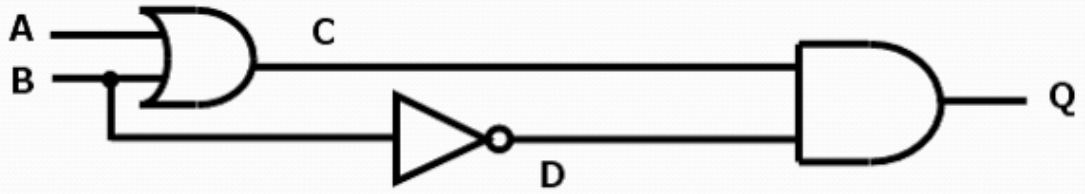
Have a go at trying to complete these truth tables based on the logic gates



Input A	Input B	C	Q
0	0	**0**	**1**
0	1	**1**	**0**
1	0	**1**	**0**
1	1	**1**	**0**

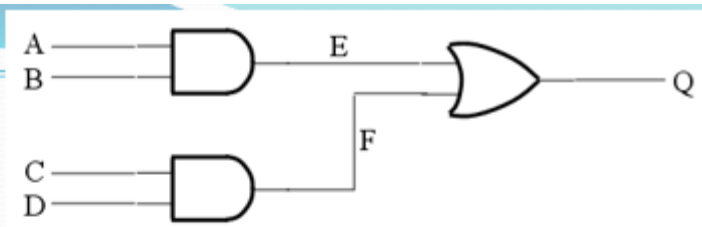


Input A	Input B	C	$\overline{Q}$
0	0		
0	1		
1	0		
1	1		



Input A	Input B	C	D	Q
0	0			
0	1			
1	0			
1	1			

Circuit 4



Input A	Input B	Input C	Input D	E	F	Q
0	0	0	0			
0	0	0	1			
0	0	1	0			
0	0	1	1			
0	1	0	0			
0	1	0	1			
0	1	1	0			
0	1	1	1			
1	0	0	0			
1	0	0	1			
1	0	1	0			
1	0	1	1			
1	1	0	0			
1	1	0	1			
1	1	1	0			
1	1	1	1			